WHAT IS CLAIMED IS:

1. A process for recycling a vapor-phase chemical comprising:

introducing vapor-phase chemicals into a reactor with sufficiently supplied energy to cause a reaction in said reactor;

exhausting gases from said reactor resulting from said reaction;

separating a first gas from said exhausted gases;

purifying said first gas; and thereafter

introducing said first gas into said reactor.

2. The process of Claim 1, wherein said reaction comprises depositing a thin film layer on a substrate positioned in said reactor.

3. The process of Claim 1, wherein said first gas comprises H_2.

4. The process of Claim 1, wherein said vapor-phase chemicals comprise H_2.

5. The process of Claim 4, wherein said first gas comprises between 80% to 90% of the quantity of said H_2 introduced in said reactor.

6. The process of Claim 1, wherein the sufficient supplied energy comprises an RF low frequency power energy level of between about 0.318 watts/cm^2 to about 3.18 watts/cm^2.

7. The process of Claim 1, wherein said reactor comprises a tapered outer shell surrounding a tapered susceptor.

8. A process for recycling a gas used in semiconductor processing applications, said process comprising:

introducing H_2 into a semiconductor reactor;

exhausting at least a portion of said H_2 from said reactor;

purifying said exhausted H_2; and thereafter

introducing said purified H_2 into said semiconductor reactor.

9. The process of Claim 8, further comprising introducing vapor-phase chemicals into a reactor with sufficiently supplied energy to cause a reaction in said reactor.

10. The process of Claim 8, wherein said purified H_2 comprises between 80% to 90% of the quantity of said H_2 introduced in said reactor.

11. A system for recycling a vapor phase chemical, said system comprising:

a reactor chamber capable of receiving and exhausting vapor-phase chemicals;

a gas scrubber capable of receiving vapor-phase chemicals exhausted from said reactor chamber and outputting a first gas; and

a gas purifier capable of purifying said first gas, said purified first gas being returnable to said reactor chamber.

12. The system of Claim 11, wherein said reactor chamber is a PECVD reactor.

13. The system of Claim 11, wherein said first gas comprises H_2.

14. The system of Claim 11, wherein said purified first gas comprises H_2 comprising between 80% to 90% of the quantity of said H_2 introduced in said reactor.

15. The system of Claim 11, further comprising a pump for pumping said first gas through said system.